

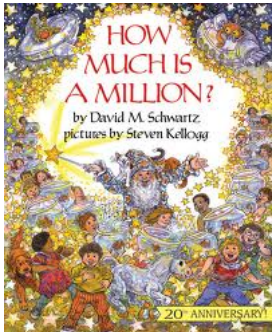
Chapter 9 Exponents & Scientific Notation

9.5 Reading Scientific Notation

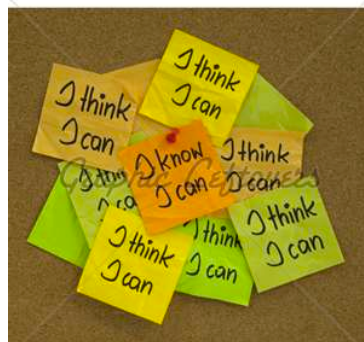
Unit Question: What is the power of powers?

Learner Profile: Reflective

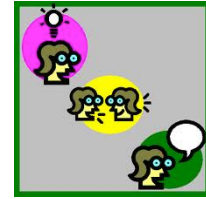
Area of Interaction: Community & Service



I Can Statement:
I can read numbers that
are written in scientific
notation.



Think, Pair, Share



How does a calculator display really, really large or really, really small numbers? (You can use a calculator to figure this out.)



Key Idea

Scientific Notation

A number is written in **scientific notation** when it is represented as the product of a factor and a power of 10. The factor must be at least 1 and less than 10.

The factor is at least 1 and less than 10.

$$\rightarrow 8.3 \times 10^{-7} \leftarrow$$

The power of 10 has an integer exponent.

1

Identifying Numbers Written in Scientific Notation

Tell whether the number is written in scientific notation. Explain.

a. 5.9×10^{-6}

- ❖ The factor is at least 1 and less than 10. The power of 10 has an integer exponent. So, the number is written in scientific notation.

b. 0.9×10^8 90000000 9×10^7 90000000

- ❖ The factor is less than 1. So, the number is not written in scientific notation.



Key Idea

Writing Numbers in Standard Form

When writing a number from scientific notation to standard form, the absolute value of the exponent tells you how many places to move the decimal point.

- If the exponent is **negative**, move the decimal point to the **left**.
- If the exponent is **positive**, move the decimal point to the **right**.

2.13×10^3 213 2130

2.13×10^3 213
0.00213

2

Writing Numbers in Standard Form

a. Write 3.22×10^{-4} in standard form.

$$3.22 \times 10^{-4} = 0.000322$$

4

Move decimal point $|-4| = 4$ places to the left.b. Write 7.9×10^5 in standard form.

$$7.9 \times 10^5 = 790,000$$

5

Move decimal point $|5| = 5$ places to the right.

On Your Own

1. Is 12×10^4 written in scientific notation? Explain.

Write the number in standard form.

2. 6×10^7

3. 9.9×10^{-5}

4. 1.285×10^4

60000000
60000000

9

12850
12850

0.000099
0.000099

3 Comparing Numbers in Scientific Notation

An object with a lesser density than water will float. An object with a greater density than water will sink. Use each given density (in kilograms per cubic meter) to explain what happens when you place a brick and an apple in water.

Water: 1.0×10^3

Brick: 1.84×10^3

Apple: 6.41×10^2



Write each density in standard form.

Water

$$1.0 \times 10^3 = 1000$$

Brick

$$1.84 \times 10^3 = 1840$$

Apple

$$6.41 \times 10^2 = 641$$

- ❖ The apple is less dense than water, so it will float. The brick is denser than water, so it will sink.

EXAMPLE 4 Real-Life Application



A female flea consumes about 1.4×10^{-5} liter of blood per day.

A dog has 100 female fleas. How many milliliters of blood do the fleas consume per day?

$$\begin{aligned} 1.4 \times 10^{-5} \cdot 100 &= 0.000014 \cdot 100 \\ &= 0.0014 \end{aligned}$$

Write in standard form.

Multiply.

- ❖ The fleas consume about 0.0014 liter, or 1.4 milliliters of blood per day.

On Your Own

- WHAT IF?** In Example 3, the density of lead is 1.14×10^4 kilograms per cubic meter. What happens when lead is placed in water?
- WHAT IF?** In Example 4, a dog has 75 female fleas. How many milliliters of blood do the fleas consume per day?

Now You're Ready
Exercise 27

I Can Statement:
I can read numbers that
are written in scientific
notation.



Assignment:

Textbook p.380-381
1,2 12-14, 16-30even
Workbook p195-196

